UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner:	MERCIER, Melissa S.
Art Unit:	1615
Application of:	PODHAJNY, Richard M.
Serial No.:	10/765,023
Filed:	January 26, 2004
Confirmation No.	1299
For:	**ANTI-MICROBIAL PACKAGING MATERIALS AND METHODS FOR MAKING THE SAME**

Mail Stop Appeal Brief Patents
Commissioner for Patents
Alexandria, VA 22313-1450

APPEAL BRIEF UNDER 37 C.F.R. §41.37

This is an appeal from the final rejections of claims 1-2, 4-5 and 7-30 made in the final Office Action mailed October 20, 2008 in the referenced application ("final Office Action"). For the reasons discussed below, Applicant requests reversal of the rejections of the claims and allowance thereof.

A Notice of Appeal was filed March 16, 2009, making the filing of this Appeal Brief timely.

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

The real party in interest is **BPSI HOLDINGS, LLC** of Wilmington, Delaware.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF THE CLAIMS

Claims 1-2, 4-5 and 7-30 are currently pending and are presented on appeal.

Claims 3 and 6 were previously cancelled and claims 1, 4-5, 10, 13 and 18 were amended.

A copy of the claims presented on appeal is attached in Section VIII, Claims Appendix.

IV. STATUS OF AMENDMENTS

No amendments have been filed subsequently to the issuance of the Final Office Action mailed October 20, 2008.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Sole independent claim 1 recites a zeolite-containing water-based or organic solvent-based dispersion which can be printed onto a surface of a substrate. The dispersion has:

a) a polymer having an acid number of less than about 200 when the dispersion is water-based; and

b) from about 0.5% to about 10% by weight zeolites containing anti-microbial metal ions. The zeolites have a particle size of between about 2 and about 7 microns, and a pore size of between about 3 and about 5 Angstroms. The dispersion can be printed onto a surface of a substrate.

Support for independent claim 1, as pending, is found in originally filed claim 1 at page 1, lines 3-7 of the originally filed specification and, for the later added limitations, i.e., 1) that the solvent-based dispersion is an organic solvent-based dispersion, is found on lines 24-27 on page 9 of the specification;

2) that the acid number of the polymer is less than about 200 when the dispersion is water-based, is found on lines 6-7 on page 6 of the specification; and

3) that the water-based or organic solvent-based dispersion can be printed onto a surface of a substrate to render it anti-microbial or otherwise more resistant to bacteria, is found on lines 26-31 on page 5 of the specification.

Claim 2 which is dependent on claim 1, specifies that the anti-microbial metal ions in the zeolite-containing dispersion are silver ions.

Claim 4 which is dependent on claim 1, specifies that the pH of the water-based dispersion is greater than or equal to about 9.

Claim 5 which is dependent on claim 1, specifies that the pH of the water-based dispersion is less than about 9.7.

Claim 7 which is dependent on claim 1, specifies that the acid number of the polymer in the dispersion is less than about 80.

Claim 8 which is dependent on claim 7, further specifies that the acid number of the polymer in the dispersion is less than about 70.

Claim 9 which is dependent on claim 1, specifies that the polymer in the dispersion is an acrylic polymer.

Claim 10 which is dependent on claim 9, further specifies that the acrylic polymer is in the form of an acrylic emulsion.

Claim 11 which is dependent on claim 10, specifies that the acid number of the acrylic polymer is from about 45 to about 192.

Claim 12 which is dependent on claim 10, specifies that the acrylic polymer in the acrylic emulsion has an acid number of 64 or 55.

Claim 13 which is dependent on claim 1, specifies that the polymer is the zeolite-containing dispersion is nitrocellulose.

Claim 14 which is dependent on claim 1, specifies that the viscosity of the dispersion is between about 10 and about 400 centipoise at 10-25 °C.

Claim 15 which is dependent on claim 1, specifies that the viscosity of the dispersion is between about 200 and about 300 centipoise at 10-25 °C.

Claim 16 which is dependent on claim 1, specifies that the zeolites comprise from about 1% to about 5% by weight of the dispersion.

Claim 17 which is dependent on claim 1, specifies that the zeolites comprise from about 2% to about 5% by weight of the dispersion.

Claim 18 which is dependent on claim 1, specifies that the zeolites in the dispersion have a particle size of from about 4 to about 6 microns, and a pore size of from about 4 to about 5 Angstroms.

Claim 19 which is dependent on claim 1, recites a method of applying an anti-microbial treatment to a surface of a packaging material. The method includes a) providing a dispersion having the features of claim 1; b) printing the dispersion onto the surface of the packaging material, and c) drying the dispersion to form a dried coating layer on at least a portion the packaging material surface.

Claim 20 which is dependent on claim 19, specifies that the dried coating layer is hydrophobic.

Claim 21 which is dependent on claim 19, specifies that the dispersion is printed in a discontinuous pattern over the surface of the packaging material.

Claim 22 which is dependent on claim 19, specifies that the printing is rotogravure printing.

Claim 23 which is dependent on claim 19, specifies that the printing is silk screen, offset gravure, flexographic or lithographic printing.

Claim 24 which is dependent on claim 19, specifies that the printed dispersion coating layer has a thickness of from about 1 micron to about 12 microns.

Claim 25 which is dependent on claim 24, further specifies that the dried dispersion coating layer has a thickness of from about 2 microns to about 8 microns.

Claim 26 which is dependent on claim 19, specifies that the packaging material is a polymer film.

Claim 27 which is dependent on claim 19, specifies that the packaging material is selected from the group consisting of cellophanes, vinyl chlorides, vinyl chloride copolymers, cellulose acetate films, vinylidene chlorides, vinylidene chloride copolymers, ethyl cellulose, aluminum foils, methyl cellulose, laminates, polyesters, papers, polyethylenes, paperboards, polypropylenes, glassines, polystyrenes, nylons and combinations thereof.

Claim 28 is a product by process claim and specifies that the packaging material with anti-microbial properties is made by the method of claim 19.

Claim 29 which is dependent on claim 1, recites a method of rendering a substrate anti-microbial or otherwise more resistant to bacteria. The method recites a) providing a dispersion of claim 1; and b) applying the dispersion onto a surface of the substrate.

Claim 30 which is dependent on claim 29, specifies that the substrate used in the process is selected from the group consisting of paper, paperboard, nylon films, polyester films and polystyrene films.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 1, 2, 7, 8, 14-18 and 29 are not patentable under 35 U.S.C. §103 for obviousness over Yokota et al. (U.S. 5,783,570, hereinafter "Yokota").

2. Whether claims 1, 2, 7-12, 14-19, 21-25 and 29 are not patentable under 35 U.S.C. §103 for obviousness over Sakai et al. (U.S. 5,280,054, hereinafter "Sakai").

3. Whether claims 4, 5, 19, 20, 26-28 and 30 are not patentable under 35 U.S.C. §103 for obviousness over Yokota in view of Lindgren et al. (U.S. 5,603,997, hereinafter "Lindgren").

VII ARGUMENT

1. Rejection of claims 1, 2, 7, 8, 14-18 and 29 over Yokota.

Pending claims 1, 2, 7, 8, 14-18 and 29 were finally rejected under 35 U.S.C. § 103(a) as originally being unpatentable over Yokota. (Final Office Action, page 2, third paragraph).

As explained below, the final Office Action mischaracterizes the teachings of the references relied upon for the rejection as well as the presently claimed invention, relies on erroneous rationales and is legally flawed. Applicant discusses below the errors made by the Examiner in connection with the reference and how, in view of these errors, the claims are not obvious over Yokota.

Independent claim 1 is directed to a printable zeolite-containing dispersion comprising a polymer with an acid number of less than about 200, when the dispersion is water based, and zeolites containing anti-microbial metal ions.

Yokota does not teach a printable zeolite-containing dispersion comprising, *inter alia*, a polymer with an acid number of less than about 200 when the dispersion is water-based. Rather, Yokota describes three types of compositions without any reference to a particular acid number:

1. A composition comprising an organic solvent soluble mucopolysaccharide with an anti-bacterial agent (*e.g.*, col. 5, lines 51-54);
2. A composition comprising an organic solvent-soluble mucopolysaccharide and an organic polymer material added of a plasticizer exhibiting antibacterial activity (*e.g.*, col. 6, lines 10-36); and
3. A composition comprising an organic solvent-soluble mucopolysaccharide, an antibacterial agent and an organic polymer material.

There is absolutely no disclosure in Yokota regarding printable compositions nor is there any disclosure at all regarding water-based compositions, let alone those containing the polymer required by claim 1, i.e. those having an acid number of less than about 200. There is instead broad disclosure regarding a myriad of potential compositions. The breadth of the disclosure is such that one of ordinary skill is left with

essentially no guidance as to how one could prepare a printable composition as Applicant has done. In such situations, it has been held that when a reference discloses a class of compounds, i.e., a genus, a person of ordinary skill in the art should be able to "at once envisage each member of th[e] . . . class" for the individual compounds, i.e., species, to be enabled. *In re Petering*, 301 F.2d 676, 681 (C.C.P.A. 1962). If the members cannot be envisioned, the reference does not disclose the species and the reference is not enabling. One simply cannot read Yokota and envisage the type of polymers or compositions which are printable. As such, it cannot be said that the claims are rendered obvious by the reference. Indeed, Applicant submits that none of the three compositions is remotely comparable to the subject matter of claim 1 or those dependent thereon.

Further, as explained by Dr. Lorenzo in the attached Declaration at ¶ 8, (hereinafter, the "Dr. Lorenzo Declaration"), the relevant/suitable printing techniques applicable to presently claimed subject matter include rotogravure, flexography, offset, lithography and inkjet. Dr. Lorenzo Declaration, ¶ 8.

As mentioned above, Yokota is deficient as a reference with respect to the claimed invention. Polymers and zeolites cannot be arbitrarily combined with the expectation of producing a stable dispersion onto a material using one of the relevant printing techniques. In order to produce a stable dispersion and to prevent problems such as precipitation, many properties must be careful considered. Polymeric dispersions with particles are highly non-linear systems and small changes in concentrations can result in dramatic changes in physical properties, including phase transitions. Dr. Lorenzo Declaration, ¶ 9.

Unexpectedly, Applicant had discovered that zeolite-containing dispersions can be effectively employed to render a material anti-microbial or otherwise resistant to bacteria using the relevant printing techniques and that the dispersion of claim 1 is described as especially suitable for printing. Dr. Lorenzo Declaration, ¶ 10.

In fact, printing conventional water-based dispersions with acid numbers above 200 is inadequate, in part because a complex is formed that precipitates and causes the viscosity of the dispersion to increase to a point where dispersion cannot be printed. The

examples of the application therefore demonstrated the criticality of printing a dispersion having a polymer with the acid number of claim 1. Dr. Lorenzo Declaration, ¶ 11.

As summarized on the table below based upon the data reported in Example 5 of the application, water-based dispersions having polymers with acid numbers above 200 could not be satisfactorily printed. A dispersion having a Joncryl 678 resin with an acid number of 215 became unstable because the viscosity of the solution increased and eventually caused settling of the resin as metal complex. Settling was also observed when employing Joncryl DFC-3015 with an acid number of 240 and Joncryl DFC-3025 with an acid number of 220. It is believed that polymers with acid numbers above 200 cause precipitation due to the presence of high levels of dissolved metal ions. Dr. Lorenzo Declaration, ¶ 12.

Resin	Acid Number	Printability
Joncryl 678	215	Unstable, high viscosity, settling observed
Joncryl DFE-3015	240	Immediate settling
Joncryl DFC-3025	220	Immediate settling
Joncryl 80	60	No settling
Joncryl DFC-3030	64	No settling
Joncryl DFC-3040	55	No settling

In contrast, a dispersion having Joncryl 80 with an acid number of 60 did not settle. Similarly, settling was not observed when employing Joncryl DFC-3030 with an acid number of 64 or Joncryl DFC-3040 with an acid number of 55. The use of polymer having an acid number less than about 200 contributes to the stability of the water-based dispersion and its suitability for printing. Dr. Lorenzo Declaration, ¶ 13.

The data presented in the table above, demonstrated the criticality of printing a polymer with an acid number below 200. Yokota does not recognize this criticality. Without knowledge of the important property, the skilled artisan would not be able to predict which polymers can be employed in a printable dispersion from the broad lists of Yokota. The skilled artisan might simply assume that all of the polymers of Yokota are

suitable. However, all of the polymers are not printable as illustrated in the table above. The present invention therefore differs from a situation where a known variable is optimized to produce a desired result. Instead, applicant has surprisingly discovered that the acid number of the polymer contributes to the stability, viscosity and consequently to the printability of the dispersion. Yokota does not recognize the importance of the acid number and the skilled artisan would not therefore be motivated to optimize the same. Dr. Lorenzo Declaration, ¶ 14.

Further, the table below lists the viscosity range required by each relevant printing technique. For printing, a dispersion must be stable and single phase. Dr. Lorenzo Declaration, ¶ 15.

Printing process	Dispersion viscosity (cP)
Lithographic	10,000-50,000
Letterpress	1,000-50,000
Screen	1,000-5,000
Flexographic	50-500
Rotogravure	30-200
Inkjet	2-20

Accordingly, since Yokota was silent with regard to printing at all, it would not have been obvious based on its teachings to print a water-based dispersion with a polymer having an acid number of less than about 200. Yokota does not teach or suggest a printing dispersion onto a substrate as claimed herein. Such techniques are quite different from the coating methods Yokota teaches. Applicant did not merely select or optimize properties that were considered relevant by Yokota. Rather, the Applicant discovered that the acid number of the polymer determined the viscosity and stability of the dispersion, and consequently its printability. Accordingly, Yokota does not render obvious the subject matter of claim 1. Dr. Lorenzo Declaration, ¶ 16.

Thus, as explained above, Yokota does not teach all of claim 1 limitations (*e.g.*, a printable dispersion containing a polymer with an acid number of less than 200, when the dispersion is water-based, and zeolites containing-antimicrobial metal ions).

The final Office Action at page 8 argues that Yokota discloses a "finite" groupings of polymers. That assertion is incorrect. As explained above, polymers and zeolites cannot be arbitrarily combined with the expectation of producing a stable dispersion onto a material using one of the relevant printing techniques. Dr. Lorenzo Declaration, ¶ 9.

On the contrary, Yokota does not disclose polymers with acid numbers less than 200 nor does it disclose a "printable" composition. Yokota only teaches composition suitable for being coated, sprayed or dipped onto a substrate (*e.g.*, col. 7, lines 38-45). None of these techniques is similar to printing as used in the context understood by one of ordinary skill in this art.

Furthermore, the final Office Action (*e.g.*, page 8) argues that the recitation of claim 1 "can be printed onto a surface of a substrate" is regarded as future intended use of the composition and not given patentable weight. That is also an incorrect reading of the claim. The limitation "can be printed" has the meaning of "being printable" as supported by the specification (*e.g.*, from page 12, paragraph [0045], to page 13, paragraph [0047]).

Accordingly, for the reasons set forth above, the subject matter of claim 1 is not render obvious by the teachings of Yokota.

Finally, the final Office Action argues that since the reference discloses that the dispersion can be sprayed or coated onto the substrate, it would lead one of ordinary skill in the art to attempt to print the dispersion. Applicant respectfully disagrees with this assertion. In order to choosing to attempt to print the dispersion from a finite number of methods for applying the substrate, one skilled in the art should have a reasonable expectation of success.

However, for the reasons set forth above, applicant asserts that one skilled in the art would not have attempted to print the composition disclosed by Yokota, in that because of the settling and the viscosity Yokota's compositions cannot be printed.

Accordingly, the Examiner's interpretation of the subject matter of claim 1 is incorrect and applicant submits that it is not rendered obvious by the teachings of Yokota. Thus, as claims 2, 7, 8, 14-18 and 29 are all dependent from claim 1, Applicant submits that a *prima facie* obviousness has not been established, the rejection of the claims is untenable and the obviousness rejection is improper.

2. **Rejection of claims 1, 2, 7-12, 14-19 and 29 over Sakai.**

Pending claims 1, 2, 7-12, 14-19 and 29 were finally rejected under 35 U.S.C. § 103(a) as originally being unpatentable over Sakai. (Final Office Action, page 5, first paragraph).

As set forth above, the presently claimed invention is directed to a composition comprising a dispersion containing a polymer with an acid number of less than 200 when the dispersion is water-based and zeolites containing-antimicrobial metal ions.

Sakai suffers from the same defects of Yokota above, *e.g.*, it does not teach a printable dispersion comprising a polymer with an acid number of less than 200 when the dispersion is water-based and zeolites containing-antimicrobial metal ions. On the contrary, Sakai teaches and discloses a composition in which a fungiproof agent (D) is optional and it might become part of the composition provided that the component (A), (B) and (C) are also present (*e.g.*, col. 11, lines 3-6). The components (A), (B) and (C) comprise an organic-inorganic composite reaction product prepared by the process of reacting silica vinylsilane monomer and a different monomer (A); a curing agent (B); and a hydroxyl group-containing polyester resin (C) (*e.g.*, col. 2, lines 52-65). Thus, Sakai's composition is also very different from the presently claimed subject matter. It should also be noted that since the reference does not disclose a printable composition, it cannot be said that the reference discloses the subject matter of claims 19 or 29 which recite methods of applying the compositions of claim 1 onto packaging materials and the like. There is no disclosure that the compositions of Sakai was in fact printable.

This is also confirmed by the Declaration of Dr. Lorenzo, for the same reasons applied to the teachings of Yokota. Accordingly, as with Yokota above, Sakai also fails to render obvious the subject matter of claims 1, 2, 7-12, 14-19 and 29 and Applicant

respectfully submits that that a *prima facie* obviousness has not been established, the rejection of the claims is untenable and the obviousness rejection is improper.

3. **Rejection of claims 4-5, 19-20, 26-28 and 30 over Yokota in view of Lindgren.**

Pending claims 4-5, 19-20, 26-28 and 30 were finally rejected under 35 U.S.C. § 103(a) as originally being unpatentable over Yokota in view of Lindgren. (Final Office Action, page 6, last paragraph). Lindgren was cited as disclosing secondary features included in these dependent claims. The reference however does nothing to cure the deficiencies of Yokota. There is no disclosure of printing the zeolites onto the packaging surface. Instead, the zeolites are part of a packaging material suspension which is "dewatered" into paperboard.

As set forth above, Yokota does not render obvious the claimed subject matter and Lindgren cannot cure that deficiency since it suffers from the same defect. It follows that the combination of Yokota with Lindgren also fails to disclose, teach or even suggest the claimed invention as embodied by the claims in this grouping.

Accordingly, Applicant respectfully submits that a *prima facie* obviousness has not been established, the rejection of the claims is untenable and the obviousness rejection is improper.

VIII. CLAIMS APPENDIX

1. A zeolite-containing water-based or organic solvent-based dispersion, comprising:

a) a polymer having an acid number of less than about 200 when the dispersion is water-based; and

b) from about 0.5% to about 10% by weight zeolites containing anti-microbial metal ions, said zeolites having a particle size of between about 2 and about 7 microns, and a pore size of between 3 and about 5 Angstroms,

wherein said water-based or organic solvent-based dispersion can be printed onto a surface of a substrate.

2. The zeolite-containing dispersion of claim 1, wherein the anti-microbial metal ions are silver ions.

4. The zeolite-containing dispersion of claim 1, wherein the pH of the water-based dispersion is greater than or equal to about 9.

5. The zeolite-containing dispersion of claim 1, wherein the pH if the water-based dispersion is less than about 9.7.

7. The zeolite-containing dispersion of claim 1, wherein the acid number of said polymer is less than about 8.

8. The zeolite-containing dispersion of claim 7, wherein the acid number of said polymer is less than about 7.

9. The zeolite-containing dispersion of claim 1, wherein the polymer is an acrylic polymer.

10. The zeolite-containing dispersion of claim 9, wherein the acrylic polymer is an acrylic emulsion.

11. The zeolite-containing dispersion of claim 10, wherein the acid number of the acrylic polymer is from about 45 to about 192.

12. The zeolite-containing dispersion of claim 10, wherein the acrylic polymer in the acrylic emulsion has an acid number of 64 or 55.

13. The zeolite-containing dispersion of claim 1, wherein the polymer is nitrocellulose.

14. The zeolite-containing dispersion of claim 1, wherein the viscosity of the dispersion is between about 10 and about 400 centipoise at 10-25 °C.

15. The zeolite-containing dispersion of claim 1, wherein the viscosity of the dispersion is between about 200 and about 300 centipoise at 10-25 °C.

16. The zeolite-containing dispersion of claim 1, wherein the zeolites comprise from about 1% to about 5% by weight of the dispersion.

17. The zeolite-containing dispersion of claim 1, wherein the zeolites comprise from about 2% to about 5% by weight of the dispersion.

18. The zeolite-containing dispersion of claim 1, wherein the zeolites have a particle size of from about 4 to about 6 microns, and pore size of from about 4 to about 5 Angstroms.

19. A method of applying an anti-microbial treatment to a surface of a packaging material, comprising:

a) providing a dispersion of claim 1;

b) printing said dispersion onto said surface of said packaging material; and

c) drying said dispersion to form a dried coating layer on at least a portion the packaging material surface.

20. The method of claim 19, wherein the dried coating layer is hydrophobic.

21. The method of claim 19, wherein the dispersion is printed in a discontinuous pattern over the surface of the packaging material.

22. The method of claim 19, wherein the printing is rotogravure printing.

23. The method of claim 19, wherein the printing is silk screen, offset gravure, flexographic or lithographic printing.

24. The method of claim 19, wherein the printing dispersion coating layer has a thickness of from about 1 micron to about 12 microns.

25. The method of claim 24, wherein the dried dispersion coating layer has a thickness of from about 2 microns to about 8 microns.

26. The method of claim 19, wherein said packaging material is a polymer film.

27. The method of claim 19, wherein said packaging material is selected from the group consisting of cellophanes, vinyl chloride, vinyl chloride copolymers, cellulose acetate films, vinylidene chlorides, vinylidene chloride copolymers, ethyl cellulose, aluminum foils, methyl cellulose, laminates, polyesters, papers, polyethylenes, paperboards polypropylenes glassines, polystyrenes, nylons and combinations thereof.

28. A packaging material with anti-microbial properties, made by the method of claim 19.

29. A method of rendering a substrate anti-microbial or otherwise more resistant to bacteria, comprising

a) providing a dispersion of claim 1; and

b) applying said dispersion onto a surface of said substrate.

30. The method of claim 29, wherein said substrate is selected from the group consisting of paper, paperboard, nylon films, polyester films and polystyrene films.

IX. EVIDENCE APPENDIX

Declaration of Dr. Jose M. Lorenzo, previously submitted in the Patent Office on July 11, 2008.

X. RELATED PROCEEDINGS APPENDIX

None.

FEES

Payment by credit card in the amount of Five Hundred Forty Dollars ($540.00) is being concurrently made with the filing of this paper to cover the fee set forth in 37 C.F.R. §41.20(b)(2) for a large entity.

It is believed that no fees other than those paid concurrently are due in connection with the filing of this paper. However, should it be deemed that any other fee is due in connection with this paper, authorization is hereby given to charge such fee to Deposit Account No. 02-2275.

Respectfully submitted,

LUCAS & MERCANTI, LLP

Dated: May 18, 2009

By: /Michael N. Mercanti/ Reg. No. 33,966

Michael N. Mercanti

Reg. No. 33,966

CUSTOMER NO. 20311